Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, D.C.

In the Matter of

Amendment of Part 90 of the Commission's Rules To Provide for the Use of the 220-222 MHz Band by the Private Land Mobile Radio Service	)	PR Docket No. 89-552
Implementation of Sections 3(n) and 332 of the Communications Act	)	GN Docket No. 93-252
Regulatory Treatment of Mobile Services	)	
Implementation of Section 309(j) of the Communications Act — Competitive Bidding	)	PP Docket No. 93-253

MEMORANDUM OPINION AND ORDER ON RECONSIDERATION

Adopted: May 14, 1998; **Released:** May 21, 1998

By the Commission: Commissioner Ness issuing a statement.

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I. INTRODUCTION; EXECUTIVE SUMMARY

1. In this Order we consider Petitions for Reconsideration or Clarification of two Orders concerning the 220-222 MHz radio service (220 MHz service). On January 26, 1996, the Commission adopted final rules in the *220 MHz Second Report and Order*,[1] which enabled 220 MHz licensees to modify their licenses to relocate their authorized base stations within Commission specified parameters. In the *220 MHz Third Report and Order*,[2] adopted on February 19, 1997, the Commission established rules to govern the future operation and licensing of the 220 MHz service.

[1] Amendment of Part 90 of the Commission's Rules To Provide for the Use of the 220-222 MHz Band by the Private Land Mobile Radio Service, PR Docket No. 89-552, Implementation of Sections 3(n) and 332 of the Communications Act, Regulatory Treatment of Mobile Services, GN Docket No. 93-252, Second Report and Order, 11 FCC Rcd 3668 (1996) (*220 MHz Second Report and Order*).

[2] Amendment of Part 90 of the Commission's Rules To Provide for the Use of the 220-222 MHz Band by the Private Land Mobile Radio Service, PR Docket No. 89-552, Implementation of Sections 3(n) and 332 of the Communications Act, Regulatory Treatment of Mobile Services, GN Docket No. 93-252, Implementation of Section 309(j) of the Communications Act – Competitive Bidding, PP Docket No. 93-253, Third Report and Order; Fifth Notice of Proposed Rulemaking, 12 FCC Rcd 10943 (1997) (*220 MHz Third Report and Order*).

2. The Commission has received five petitions for reconsideration or clarification of the *220 MHz Second Report and Order* and one comment filed in response to those petitions.[3] In response to these petitions, we reaffirm the decision in the *220 MHz Second Report and Order*, with one clarification. We continue to believe that the procedures the Commission has adopted provide existing 220 MHz licensees flexibility to complete construction of their systems and provide service without unreasonably impairing the opportunity of potential competitors to obtain licenses in the 220 MHz service.

3. The petitions for reconsideration or clarification of the *220 MHz Second Report and Order* address a range of issues. Based on our review of these petitions, we are taking the following actions with regard to these issues in this Order:

- We deny petitions of AMTA and SMR requesting that we permit moves up to a maximum distance of 25 kilometers (km) if the licensee is moving from a location within a Designated Filing Area (DFA) to a location outside that DFA. We also deny Incom's petition asking that we clarify our position to indicate that a licensee whose initially authorized site is located inside a DFA within 8 km of the perimeter and who seeks to modify its authorization in order to move to a location outside the DFA be permitted to move its site a maximum of 25 km.

- We grant in part petitions of AMTA and SMR requesting that we accept modifications of operating parameters other than relocation modifications to the extent that we clarify that licensees who seek to relocate may modify their antenna height above average terrain (HAAT). Otherwise, we deny these petitions with respect to this issue.

- We deny petitions of AMTA, Incom, PERS, and SMR requesting that we reconsider or clarify that if a licensee had taken delivery of its base station transceiver on or before January 26, 1996, and had filed an application for Special Temporary Authority (STA) on or before January 26, 1996, the licensee need not have been granted an STA by January 26, 1996, in order to be allowed to seek permanent authorization at its STA site.

- We deny petitions of AMTA and Incom requesting that we clarify the *220 MHz Second Report and Order* to allow waiver requests to be accompanied by an alternative site proposal.

- We deny the petition filed by In Touch asking us to clarify that the Commission will accept waiver requests other than the specific type of waiver request discussed in the

[3] A list of parties (together with short title references) filing petitions for reconsideration or clarification and comments to the *220 MHz Second Report and Order* is contained in Appendix A.

220 MHz Second Report and Order because such clarification is unnecessary under the Commission's rules.

4. The Commission has also received 11 petitions for reconsideration or clarification of the *220 MHz Third Report and Order*, seven comments filed in response to those petitions, and seven reply comments.[4] In general, we affirm the rules for the 220 MHz service adopted in the *220 MHz Third Report and Order*, however, we adopt some changes and clarifications in response to the petitions for reconsideration or clarification. Specifically, we are taking the following action with regard to issues raised in these petitions:

- We deny the petitions of AMTA, INTEK, PCIA, and SMR that we modify the Commission's rules to require the protection of the 28 dBu, rather than the 38 dBu, service contour of Phase I licensees.[5]

- We deny the petitions of SEA, PCIA, and INTEK that we modify the Commission's rules to calculate the service contour of 220 MHz Phase I base stations based on the maximum allowable power and antenna height for such stations.

- We grant in part the petitions of AMTA, INTEK, PCIA, and SMR that Phase I licensees be permitted to modify their authorizations to the extent that Phase I licensees will be permitted to make modifications to their authorizations which do not expand their 38 dBu service contour and also will be permitted to convert their site-by-site licenses to a single license. Otherwise, we deny these petitions with respect to this issue.

- At the request of Comtech, we clarify the Commission's decision to eliminate the emission mask requirement for a licensee's inner, contiguous channels, by indicating that the Commission intended the decision to apply to those inner, contiguous channels that a licensee might derive from multiple authorizations.

- We grant the petition of SEA that the antenna height limitation for stations operating in the 220 MHz band be associated with the HAAT of the station's transmitting antenna, rather than the antenna's height above ground

[4] A list of parties (together with short title references) filing petitions for reconsideration or clarification, comments, and reply comments to the *220 MHz Third Report and Order* is contained in Appendix B.

[5] For a description of the licensing phases for 220 MHz service, see note 10, *infra*.

- We deny the petitions of Comtech and Glenayre that we raise the power limit for fixed stations operating on mobile channels from 50 watts effective radiated power (ERP) to 500 watts ERP.

- We dismiss on procedural grounds the petitions of Comtech and Glenayre that we raise the power limit for the base stations of nationwide licensees from 500 watts ERP to 1400 watts ERP.

- We deny the request of Metricom that we specify the criteria used to determine whether licensees have provided substantial service.

- We remove the 220 MHz service spectrum efficiency standard, and thus grant the petition of Comtech that we eliminate the efficiency standard as applied to paging operations. Consequently, we deny the petitions of Rush and Glenayre that we amend the 220 MHz service spectrum efficiency standard.

- We dismiss on procedural grounds the petitions of Rush and Metricom that we revisit the construction requirements for Phase I licensees.

- We dismiss on procedural grounds the petitions of Global and Comtech that we revisit the requirement that nationwide, Phase I licensees construct all five channels at a minimum number of base stations at certain urban sites.

- We dismiss on procedural grounds the petitions of Global, Comtech, and Rush that we cease to require nationwide, Phase I licensees to obtain specific licenses for each base station.

- We grant the petitions of Comtech and Global seeking clarification of Section 90.769 of the Commission's Rules, by clarifying that Section 90.769 applies only to Phase II nationwide licensees and not to Phase I nationwide licensees.

- We grant the petition of National requesting that we reconsider or clarify language regarding the return of pending nationwide 220 MHz applications, by clarifying that the language ordering the return of pending nationwide applications does not apply to pending, commercial, nationwide 220 MHz applications.

- We dismiss as moot the petition of Comtech that the Commission amend its rules to permit entities to obtain more than one Phase I authorization in a geographic area.

- Consistent with the conclusions reached in the *Part 1 Third Report and Order*, we eliminate installment payment plans for small and very small businesses participating in

the 220 MHz Service auction, and increase the level of bidding credits for such entities. We will also amend the Commission's rules to permit auction winners to make their final payments within ten (10) business days after the applicable deadline, provided that they also pay a late fee of five (5) percent of the amount due.

II. BACKGROUND

5. The Commission established the 220 MHz service in the *220 MHz Report and Order* in April 1991.[6] The Commission adopted service rules for the assignment of 200 five kilohertz (kHz) channel pairs in the 220-222 MHz band to both Federal Government and private land mobile users. The Commission authorized 60 of the 200 channel pairs for nationwide licensing, with 10 of these designated for assignment to Federal Government entities. The remaining 50 nationwide channel pairs were reserved for non-Government users, with 20 channel pairs designated for "commercial" use and 30 channel pairs designated for "non-commercial" use.[7] The 20 commercial channel pairs were divided into four five-channel blocks and the 30 non-commercial channel pairs were divided into two 10-channel and two five-channel blocks. The Commission designated the remaining 140 channel pairs for non-nationwide use by both Government and non-Government licensees. The Commission also decided that all applications for 220 MHz channels would be granted on a first-come, first-served basis and that mutually exclusive applications would be assigned through random selection procedures.[8]

6. The Commission began accepting applications for 220 MHz licenses on May 1, 1991, and on May 24, 1991, after receiving over 59,000 applications, imposed a moratorium on the filing of all initial and modification applications for the 220 MHz service.[9] Since then,

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[6] Amendment of Part 90 of the Commission's Rules To Provide for the Use of the 220-222 MHz Band by the Private Land Mobile Radio Services, PR Docket No. 89-552, Report and Order, 6 FCC Rcd 2356 (1991) (*220 MHz Report and Order*).

[7] At the time of the adoption of the *220 MHz Report and Order*, the Commission used the term "commercial" to refer to licensees who would operate as carriers under Part 90 of the Commission's Rules and provide commercial radio services to end users. The Commission used the term "non-commercial" to refer to licensees who would use spectrum to satisfy their own internal communications requirements. These terms do not correlate directly with the terms Commercial Mobile Radio Service (CMRS) and Private Mobile Radio Service (PMRS), as defined in Section 20.3 of the Commission's Rules, 47 C.F.R. § 20.3.

[8] *220 MHz Report and Order*, 6 FCC Rcd at 2364-65 (paras. 59, 62)

[9] Acceptance of 220-222 MHz Private Land Mobile Applications, Order, 6 FCC Rcd 3333 (1991). The Private Radio Bureau stated that the imposition of a freeze on the acceptance of new applications was necessary to allow the Bureau to process the large number of 220 MHz applications received. *Id.* at 3333 (para. 4).

the Commission has issued authorizations to approximately 3,800 licensees to operate "non-nationwide" 220 MHz stations.[10]

A. 220 MHz Second Report and Order

7. Shortly after the Commission began processing 220 MHz applications, a court case was brought challenging the Commission's 220 MHz licensing procedures. This effectively placed all of the more than 3,000 authorizations the Commission granted in doubt for nearly a two-year period, and the uncertainty with respect to the finality of the Commission's grant of their licenses caused many licensees to refrain from constructing their stations.[11] Following the settlement of the case in March 1994, the deadline for licensees to construct their systems and place them in operation was extended on four separate occasions to allow licensees sufficient time to construct their systems.[12] Because several years had passed since 220 MHz licensees filed their applications for which licenses were granted, many licensees found that,

[10] Licensees granted authorizations from among applications filed on or before May 24, 1991, are hereinafter referred to as Phase I licensees. On August 28, 1995, the Commission released the *Third Notice*, which proposed market area licensing and more flexible technical rules for the next phase (Phase II) of licensing of the 220 MHz band. Amendment of Part 90 of the Commission's Rules To Provide for the Use of the 220-222 MHz Band by the Private Land Mobile Radio Service, PR Docket No. 89-552, RM-8506, Implementation of Sections 3(n) and 332 of the Communications Act, GN Docket No. 93-252, Implementation of Section 309(j) of the Communications Act – Competitive Bidding, 220-222 MHz, PP Docket No. 93-253, Second Memorandum Opinion and Order and Third Notice of Proposed Rulemaking, 11 FCC Rcd 188 (1995) (*Third Notice*).

[11] *See* Evans v. FCC, Order, per curiam, Case No. 92-1317 (D.C. Cir. Mar. 18, 1994) (*Evans v. FCC*).

[12] In a Public Notice released on September 10, 1992, the Private Radio Bureau announced that the construction deadline for all non-nationwide 220 MHz stations would be 120 days after the disposition of the *Evans v. FCC* case. Public Notice, 7 FCC Rcd 6378 (1992). Following the disposition of the case, the Bureau extended the construction deadline to December 2, 1994, in an Order released on March 30, 1994. *See* Amendment of Part 90 of the Commission's Rules To Provide for the Use of the 220-222 MHz Band by the Private Land Mobile Radio Services, PR Docket No. 89-552, Order, 9 FCC Rcd 1739 (1994). In the *CMRS Third Report and Order*, the Commission established April 4, 1995, as the construction deadline. Implementation of Sections 3(n) and 332 of the Communications Act, Regulatory Treatment of Mobile Services, GN Docket No. 93-252, Third Report and Order, 9 FCC Rcd 7988, 8077 (para. 184) (1994) (*CMRS Third Report and Order*), *recon. pending*. On February 17, 1995, the Wireless Telecommunications Bureau released an Order extending the deadline to December 31, 1995. *See* Amendment of Part 90 of the Commission's Rules To Provide for the Use of the 220-222 MHz Band by the Private Land Mobile Radio Services, PR Docket No. 89-552, Order, 10 FCC Rcd 3356 (Wireless Tel. Bur. 1995). On December 15, 1995, the Bureau released an Order providing for a further extension of the construction deadline contingent upon the closure of the Commission as a result of any furlough of Federal Government employees. The ensuing 23-day Federal furlough resulted in an extension of the construction deadline to February 2, 1996, pursuant to a formula established in the Bureau Order. *See* Amendment of Part 90 of the Commission's Rules To Provide for the Use of the 220-222 MHz Band by the Private Land Mobile Radio Services, PR Docket No. 89-552, Order, 11 FCC Rcd 9710 (Wireless Tel. Bur. 1995).

for various unforeseen reasons, they were unable to construct at their authorized locations. In response, the Commission issued the *Fourth Notice*, proposing a procedure to enable existing licensees in the 220 MHz service to seek modification of their authorizations to relocate their base stations.[13]

8. Based on its review of the record following the release of the *Fourth Notice*, on January 26, 1996, the Commission adopted and released the *220 MHz Second Report and Order*. In that *Order*, the Commission adopted a procedure that enabled 220 MHz licensees to modify their licenses to relocate their authorized base stations to previously unauthorized locations. Under this procedure, licensees with base stations authorized inside any DFA[14] were permitted to relocate their base stations up to one-half the distance over 120 km toward any authorized co-channel base station, to a maximum distance of 8 km.[15] Licensees with base stations authorized outside the boundaries of any DFA were permitted to relocate their base stations up to one-half the distance over 120 km toward any authorized co-channel base station, to a maximum distance of 25 km, so long as they did not locate their base station more than 8 km inside the boundaries of any DFA.[16] A licensee was permitted to relocate its base station less than 120 km from the base station of a co-channel licensee or more than one-half the distance over 120 km toward the base station of a co-channel licensee only with the consent of that licensee.[17]

9. The Commission also extended the February 2, 1996 construction deadline to March 11, 1996 for all non-nationwide 220 MHz licensees that elected to construct their base stations at their originally-authorized locations, and to August 15, 1996 for all licensees granted authority to modify their licenses to relocate their base stations.[18] Licensees seeking authority to modify their authorizations to relocate their base stations were required to file, on or before March 11, 1996, a modification application or statement of their intention to file an

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[13] Amendment of Part 90 of the Commission's Rules To Provide for the Use of the 220-222 MHz Band by the Private Land Mobile Radio Service, PR Docket No. 89-552, Implementation of Sections 3(n) and 332 of the Communications Act, GN Docket No. 93-252, Fourth Notice of Proposed Rulemaking, 11 FCC Rcd 835 (1995) (*Fourth Notice*).

[14] The Commission established 50 Designated Filing Areas in its initial licensing of the 900 MHz Specialized Mobile Radio band. *See* Public Notice, Private Land Mobile Application Procedures for Spectrum in the 896-901 MHz and 935-940 MHz bands, DA 86-173, 1 FCC Rcd 543 (1986).

[15] *220 MHz Second Report and Order*, 11 FCC Rcd at 3670 (para. 9).

[16] *Id.*

[17] *Id.*

[18] *Id.* at 3674 (para. 21).

application requesting such modification, and were required to file a modification application on or before May 1, 1996.[19]

B. 220 MHz Third Report and Order

10. On July 28, 1995, the Commission adopted the *Third Notice*, which proposed a new framework for the operation and licensing of the 220-222 MHz band.[20] Based on its review of the comments in response to the *Third Notice*, the Commission adopted the *220 MHz Third Report and Order* on February 19, 1997. In the *220 MHz Third Report and Order*, the Commission decided to return pending, mutually exclusive applications for the four non-commercial, Phase I nationwide licenses and adopt a new licensing procedure for the 30 channels associated with these licenses. The Commission determined that the 30 channels would be licensed on a nationwide basis to all applicants, whether used for commercial services or for a licensee's private, internal use. The channels will be assigned, in the form of three 10-channel authorizations, through competitive bidding.

11. The Commission also decided to assign the non-nationwide licenses as five blocks (composed of 10 channels in each block) in 175 geographic areas defined as Economic Areas by the Bureau of Economic Analysis, Department of Commerce ("EA licenses") and five blocks (composed of 15 channels in each block) in geographic areas defined by six "Regional Economic Area Groupings" ("Regional licenses"). The Commission made these channels available to all eligible applicants, and decided to resolve mutually exclusive applications for these channels through competitive bidding. The Commission provided a 10-year license term for Phase II licensees, and required Phase II licensees to meet five- and ten-year construction benchmarks.

12. The Commission permitted EA and Regional licensees to operate stations anywhere within their geographic borders, provided that their transmissions did not exceed a predicted field strength of 38 dBuV/m at their border, and provided that they protect the base stations of Phase I licensees in accordance with the existing co-channel separation criteria for 220 MHz stations.

13. The Commission also decided to allow all Phase I and Phase II, nationwide and non-nationwide 220 MHz licensees to operate fixed and paging systems without the requirement that such use be on an ancillary basis to land mobile operations. The

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[19] *Id.* at 3674 (para. 22).

[20] We refer herein to licenses granted pursuant to this new framework as Phase II licenses. Licenses granted under the rules that existed prior to the adoption of the *220 MHz Third Report and Order* are referred to as Phase I licenses.

Commission further determined that it would be appropriate to permit Phase I and Phase II, nationwide and non-nationwide 220 MHz licensees, to aggregate any of their contiguous 5 kHz channels and operate on channels wider than 5 kHz, so long as they comply with a prescribed spectrum efficiency standard.

14. Finally, the Commission established rules and procedures governing the auction of the Phase II 220 MHz Service licenses. Among other things, the Commission established installment payment plans and bidding credits for small and very small businesses designed to assist such entities in overcoming economic barriers to their participation in the auction.

III. DISCUSSION

A. 220 MHz Third Report and Order Issues

15. Because one of the issues raised in connection with our reconsideration of the *220 MHz Second Report and Order* will be affected by our resolution of an issue raised on reconsideration of the *220 MHz Third Report and Order*, we will first consider the issues raised on reconsideration of the *220 MHz Third Report and Order*.

1. Protection of Phase I Licensee Operations

a. Background

16. In the *220 MHz Third Report and Order*, the Commission decided that Phase II EA and Regional licensees would be required to locate their base stations at least 120 km from the base stations of co-channel Phase I licensees, except that Phase II licensees would be permitted to locate their base stations less than 120 km from the base stations of co-channel Phase I licensees if they provide 10 dB protection to the predicted 38 dBuV/m (dBu) service contour of the base stations of the Phase I licensees.[21] This rule was derived from the rule adopted in the *220 MHz Report and Order*, which established a 120 km separation between co-channel, Phase I base stations, with shorter separations considered where licensees provide 10 dB protection to the predicted 38 dBu service contour[22] of co-channel base stations.[23]

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[21] As indicated in the *220 MHz Third Report and Order*, Phase II licensees may meet this requirement by submitting a technical analysis demonstrating that the predicted 28 dBuV/m interfering contour of their base station does not overlap the predicted 38 dBuV/m service contour of the Phase I licensee's base station. *220 MHz Third Report and Order*, 12 FCC Rcd at 11025-26 (para. 173).

[22] Unless otherwise indicated, any references to a station's "contour" or "service contour" herein refers to that station's *predicted* F(50,50) service contour, as determined by Figure 10 of Section 73.699 of the Commission's Rules, 47 C.F.R. § 73.699.

17. Six parties (AMTA, SMR, INTEK, PERS, PCIA, and SEA) seek reconsideration of this decision.[24] AMTA, SMR, INTEK, and PERS argue that Phase II licensees should be required, in locating their base stations, to afford greater protection to co-channel Phase I licensees by providing 10 dB protection to the predicted *28* dBu service contour of all co-channel Phase I base stations.[25] and SMR contends that the distance separation provided by Phase II licensees to co-channel Phase I licensees should be 170 km, rather than 120 km, except in instances where "unique terrain or other features justify a lesser distance separation."[26] PCIA and SEA do not oppose continued protection of the 38 dBu service contour, but assert that we should afford greater than 10 dB protection to that contour.

b. Adequacy of Current Protection Criteria

18. AMTA, in expressing views that are generally representative of those of other petitioners, argues that the decision made by the Commission in the *220 MHz Third Report and Order* to provide 10 dB protection to the 38 dBu contour of Phase I stations does "not

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[23] *See* Section 90.723(i) of the Commission's Rules, 47 C.F.R. § 90.723(i).

[24] In its Third Order Petition, AMTA, a trade association, indicates that its members include 220 MHz licensees. AMTA also indicates in its Third Order Petition that its 220 MHz Council "includes representatives of the vast majority of incumbent licensees, 220 MHz organizers, and narrowband 220 MHz equipment suppliers," and is "actively involved in all aspects of the 220 MHz marketplace." AMTA Third Order Petition at 2. SMR, in its Third Order Petition, indicates that it manages 85 constructed Phase I systems. SMR Third Order Petition at 2. INTEK is the parent company of Securicor Limited and Roamer One, Inc. Securicor Limited is a manufacturer of 220 MHz radio equipment. Roamer One, Inc., in comments filed on September 27, 1995, indicated that, at that time, it was "operating eighty-five (85) 220 MHz systems, and [had] shipped RF equipment or begun installation for approximately fifty-five (55) more systems." Roamer One, Inc., Comments at 2. In its Third Order Petition, INTEK indicates that Roamer One, Inc., is one of the leading operators and managers of 220 MHz land mobile radio systems. INTEK Third Order Petition at 2. PERS indicates that it has been involved in the construction of over one-hundred 220 MHz systems and that it represents a substantial number of incumbent licensees. PERS Third Order Comment at 3 (unpaginated). In its Third Order Petition, PCIA, a trade association, indicates that it has "participated in all phases of this 220 MHz proceeding." PCIA Third Order Petition at 1. SEA is a manufacturer of 220 MHz radio equipment. In its Third Order Petition, SEA indicates that it has been involved in the development of 5 kHz narrowband technology for land mobile radio users since 1981. SEA Third Order Petition at 2.

[25] USMC, which indicates in its Third Order Comments that it "believes that it manages more systems in the major markets on the East Coast than any other 220 MHz management company," concurs with AMTA's petition to increase co-channel protection for Phase I non-nationwide licensees. USMC Third Order Comments at 2.

[26] SMR Third Order Reply at 6-8.

provide adequate protection between Phase I and Phase II licensees."[27] AMTA contends that in their original comments on this issue,[28] all interested parties indicated that the 28 dBu contour was the appropriate protected service contour[29] for the 220 MHz service, claiming that "220 MHz systems were essentially outperforming the Commission's original coverage estimation by a significant degree in the real world."[30] AMTA indicates in its petition that 220 MHz customers "are currently operating throughout the 28 dBu reliable service areas,"[31] and that failure to adopt co-channel protection criteria based on a 28 dBu contour "denies Phase I 220 MHz licensees a quality of service comparable to that of competitive wireless systems."[32]

19. As a general matter, we would be concerned about taking any action that would have a negative impact on existing customers who are receiving service from a Commission licensee. We conclude, however, based upon our detailed analysis in the following sections, that retention of the existing 38 dBu protected contour will not adversely affect operations in the 220 MHz service. We base this conclusion on the lack of meaningful, valid evidence or justification in support of petitioners' claim that the 28 dBu contour is the field strength contour that should be protected in the 220 MHz service.

20. The matter of whether we should modify the Commission's protection criteria essentially turns on two issues. The first is whether we should protect the 28 dBu contour instead of the 38 dBu contour because the signal at the 28 dBu contour produces a quality of service deserving of protection. There are various references by petitioners, and by commenters in the previous proceeding, to the effect that "reliable service" is being provided at the 28 dBu contour.[33] Yet, beyond this limited, and basically anecdotal information, petitioners provide no other evidence to justify this contention. The second issue is whether, as some petitioners appear to suggest, 220 MHz signals invariably propagate farther than

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[27] AMTA Third Order Petition at 4.

[28] AMTA is referring to the comments filed in response to the *Third Notice*.

[29] The service contour to be protected may be referred to as the "protected service contour."

[30] AMTA Third Order Petition at 5.

[31] *Id.* at 8.

[32] *Id.* at 6.

[33] SMR Third Order Petition at 6; AMTA Third Order Petition at 6-7. INTEK claims that at the 24 dBu contour, customers are able to access a control channel. INTEK Third Order Petition at 4. *See also* INTEK Third Order Petition, App. A.

predicted by the Commission's Section 73.699 curves. However, petitioners provide no data to adequately support such a claim.

21. Petitioners also argue that because the Grade B contour for high VHF television stations is 8 dB lower than the Grade B contour for UHF television stations, the protected service contour for the 220 MHz service should be 12 dB lower than the 40 dBu protected service contour used for the 800 MHz and 900 MHz land mobile bands. However, as we discuss in greater detail in the following sections, operating frequency is not the sole criteria used to determine service contours, and the discussion by commenters themselves of the use of a 32 dBu contour in the cellular service is evidence of this fact. Additionally, the mathematical relationship between the Grade B contours of the UHF and high VHF television bands and the corresponding mathematical relationship between the protected service contour for the 220 MHz band and the 800 MHz and 900 MHz land mobile bands were known to potential 220 MHz licensees and manufacturers alike when the 220 MHz service rules were adopted in 1991. Yet, none of these parties sought reconsideration of the Commission's decision to employ a 38 dBu service criteria at that time.[34]

22. While we endeavor to provide appropriate protection for all licensees in all services licensed by the Commission, it is a fact that no protection criteria can guarantee that interference will not occur. In fact, in developing protection criteria between Phase II licensees the Commission recognized that interference is a possibility when it permitted co-channel Phase II licensees to place a 38 dBu signal at their common border. To address situations where interference subsequently occurs, the Commission indicated that Phase II licensees would have to resolve such occurrences between themselves.[35] In the event that instances of interference do occur between Phase I and Phase II licensees, we are confident that these licensees, too, will be able to resolve their differences.

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[34] Providing 10 dB protection to the 38 dBu service contour resulted in a 120 km distance separation between co-channel base stations, which was used to determine the assignment of Phase I 220 MHz licenses. Had the Commission provided 10 dB protection to the 28 dBu service contour instead, and adopted the maximum allowable power and antenna height parameters that were adopted in the *220 MHz Report and Order* (*i.e.*, 500 watts ERP and 150 meters HAAT), the minimum distance between co-channel stations would have been 170 km, and, as a result, fewer Phase I 220 MHz licenses would have been awarded from among the applications received in 1991.

[35] In theory, the likelihood of interference at an EA or Regional border between Phase II licensees is greater than the likelihood of interference between Phase I and Phase II stations. This is because at the EA or Regional border both Phase II licensees may provide the *same* 38 dBu signal, but Phase II licensees must provide 10 dB protection to the 38 dBu signal of the Phase I licensee. It is interesting to note, given this, that no petitions called for changes to the protection criteria for EA and Regional licensees or changes to the procedures under which interference disputes between such licensees are resolved. Moreover, none of the parties who argue for the use of 28 dBu service contour for Phase I licensees petitioned for changes to the Commission's rules to similarly limit Phase II signals to 28 dBu, rather than 38 dBu, at the border.

23. AMTA states that if interference occurs between Phase I licensees, they will be able to "resolve whatever interference problems arise without FCC involvement." If this is the case and if, as AMTA suggests, interference will affect the operations of both Phase I and Phase II licensees, we see no reason why Phase I and Phase II licensees will not be similarly able to amicably resolve any interference matters that may arise. As AMTA points out, many of the Phase I licensees of today will be the Phase II licensees of tomorrow. And we believe that the unity that 220 MHz licensees have demonstrated in attempting to make the 220 MHz service successful over the years[36] will carry over into any negotiations that they may undertake on interference issues and will lead to a successful resolution of such matters.

24. Additionally, AMTA makes the argument that we should modify the Commission's protection criteria because failure to do so "denies Phase I 220 MHz licensees a quality of service comparable to that of competitive wireless systems." The matter of whether a 28 dBu or 38 dBu service contour provides the same quality of service as the 40 dBu service contour for 800 MHz and 900 MHz service aside,[37] we have provided virtually the same service area for 220 MHz systems as the Commission did for 800 MHz and 900 MHz systems by our selection of operating parameters. Specifically, the maximum allowable power and antenna height for 800 MHz and 900 MHz stations is 1000 watts ERP and 305 meters HAAT, which produces a 40 dBu service contour at approximately 29 miles from the transmitter. The maximum allowable power and antenna height for 220 MHz stations is 500 watts ERP and 150 meters HAAT, which produces a 38 dBu service contour at approximately 28 miles from the transmitter. Thus, in defining the maximum allowable parameters in this manner for the 220 MHz service, the Commission provided 220 MHz licensees with about the same service area as 800 MHz and 900 MHz licensees.[38]

25. When the 220 MHz service was established in 1991, the Phase I applicant, and subsequently the Phase I licensee, expected, when it obtained its license and constructed its system, to have a system that provided service to its 38 dBu contour. If a particular 220 MHz licensee's system performs better than anticipated by providing quality signals beyond its 38

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[36] For example, the members of AMTA's 220 MHz Council, representing all elements of the 220 MHz service community, have, for many years, worked together to advance the 220 MHz service. *See* AMTA Third Order Petition at 2.

[37] *See* paras. 51-52, *infra*, for further discussion of this issue.

[38] There is precedent for this type of action. The Grade A and Grade B television contours, for example, vary among the three TV bands (*i.e.*, the Grade A and Grade B contours are 68 dBu and 47 dBu, respectively for Channels 2-6; 71 dBu and 56 dBu, respectively, for Channels 7-13; and 74 dBu and 64 dBu, respectively, for Channels 14-69). Yet, in order to enable television stations operating in these three bands to produce approximately the same service area, the Commission has established widely different maximum allowable parameters for stations in each band.

dBu contour,[39] then this would be a benefit for that licensee not anticipated in 1991. We do not believe, however, that the possibility of enhanced system performance in certain unique areas of the country is a basis for providing Phase I 220 MHz licensees with protection to a service area that is larger than the service area they had originally expected to obtain. The Commission's current rules provide 220 MHz licensees with exactly the protection they had expected to receive when they applied for their licenses — *i.e.*, protection to a service area that is equivalent to the service area provided for the 800 MHz and 900 MHz land mobile radio services.[40]

26. In the 220 MHz service, we believe that we have provided appropriate protection for Phase I licensees and that it is not necessary to require Phase II licensees to provide the additional protection sought by petitioners. We conclude that to do so would force Phase II li nsees to provide unnecessary protection to Phase I licensees, thereby diminishing Phase II licensees' coverage capabilities[41] and their ability to provide service to the public. We are confident that our existing protection criteria will permit us to license future, Phase II 220 MHz licensees and will enable these and Phase I licensees to operate in harmony.

27. Having presented this overview of the arguments regarding the adequacy of the current protection criteria, as well as our conclusions and rationale, we now turn to a more detailed discussion of technical information and arguments submitted by the petitioners.

c. Analysis of Technical Arguments

(1) Estimation of Propagation Characteristics

(a) Performance of 220 MHz Signal

28. AMTA claims that the Commission "may have underestimated the propagation characteristics of the band[,]" stating that "220 MHz signals simply talk considerably farther than those in the 800 MHz and 900 MHz bands from which the 220 MHz protection criteria seemingly were extrapolated," and that this difference is "not reflected adequately in the 2 dB difference between the benchmark 40 dBu contour at 800 MHz and 900 MHz and the 38 dBu

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[39] *See, e.g.*, para. 46, *infra*.

[40] Of course, if a 220 MHz licensee or an 800 MHz or 900 MHz licensee elects to operate at a power or antenna height less than maximum allowable, then this is a decision the licensee chooses to make, and its resulting service area will be proportionally smaller than the maximum attainable (*i.e.*, less than 28 miles for the 220 MHz service, and less than 29 miles for the 800 and 900 MHz services).

[41] The 38 dBu contour of a maximum parameter Phase I station would extend approximately 28 miles. The 28 dBu contour of a maximum parameter Phase I station, however, would extend approximately 40 miles.

contour adopted at 220 MHz."[42] AMTA notes that commenters have observed that in the "real world," 220 MHz systems perform better than originally estimated by the Commission,[43] that 220 MHz systems operating at 500 watts ERP and 500 feet HAAT will provide "a high quality signal to about 50 percent of the locations, 50 percent of the time throughout a 28 dBu contour,"[44] and that members of the 220 MHz service industry will provide data that will "confirm that the actual reliable service area of a 220 MHz system is represented by a 28 dBu, not a 38 dBu, contour."[45]

29. In the following sections, we discuss the showings provided by various commenters. With regard to its statement that the Commission may have underestimated the propagation characteristics of the 220 MHz band, AMTA appears to be suggesting that 220 MHz signals propagate farther than the Commission's R-6602 curves predict.[46] However, as we discuss in later sections, neither AMTA nor any other commenters provide evidence to adequately support such a claim.

30. Furthermore, AMTA's observation that in the "real world," 220 MHz signals *perform* better than originally expected, and its claim that "high quality" 220 MHz signals are present at about 50 percent of the locations, 50 percent of the time throughout a 28 dBu contour,[47] are similarly unsupported by any study, analysis, measurements, or data that

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[42] AMTA Third Order Petition at 6-7.

[43] *Id.* at 5.

[44] *Id.* at 6.

[45] *Id.* Presumably, AMTA, in making this observation, is referring to data that it anticipated would be furnished by other commenters in support of AMTA's request for the adoption of a 28 dBu service contour. AMTA itself did not provide any such data.

[46] The R-6602 curves are found in Section 73.699 of the Commission's Rules, 47 C.F.R. § 73.699. They were developed in the Commission's report "R-6602, Development of VHF and UHF Propagation Curves for TV and FM Broadcasting," issued Sept. 7, 1966. The "F(50,50)" curves in Section 73.699 predict the location at which a transmitter, operating on a given frequency and at a given power and antenna height, will produce a particular signal strength 50 percent of the time and at 50 percent of locations. Thus, for example, the curves predict that the location of the F(50,50) 38 dBu signal for a 500 watt ERP/150 meter HAAT station is approximately 45 km from the transmitter; and that the location of the F(50,50) 28 dBu signal for a 500 watt ERP/150 meter HAAT station is approximately 65 km from the transmitter.

[47] AMTA states that systems operating at 500 watts ERP and 500 feet HAAT will provide a high quality signal to about 50 percent of the locations, 50 percent of the time, throughout the 28 dBu contour. The provision of a particular signal quality, "high quality" or otherwise, within a given contour, however, is independent of the particular power and antenna height of the station transmitter. Because service contours expand and contract as a function of power and antenna height, the 28 dBu service contour of a station operating

associate the sound produced by 220 MHz receivers operating at the 28 dBu contour, or any other contour for that matter, to any particular service quality — *e.g.*, "high quality," "reliable," or otherwise. AMTA merely states that "customers are operating throughout the 28 dBu reliable service areas."[48]

31. The fact that customers may be "operating" throughout the area encompassed by a 28 dBu contour, however, is not particularly meaningful for two reasons. First, the fact that customers are capable of "operating" in particular areas could simply mean that they are receiving transmissions in those areas that are minimally acceptable for communication. In establishing protection criteria for the land mobile radio services, our goal in the past has been to protect quality signals from interference.[49] To protect minimally acceptable or minimally intelligible signals from interference would result in extremely, and unnecessarily large distances between co-channel stations, and we have not nor would not provide this type of interference protection. Second, in the "real world," terrain can vary from flat, to hilly, to mountainous. As a result, it is quite possible to receive signals of varying field strengths at a given distance from a transmitter (*e.g.*, a mobile station situated at the top of a hill would receive a much stronger signal than a nearby mobile station at the bottom of a hill); and we have no way of knowing what type of terrain may have produced the "reliable service" claimed by AMTA.[50]

32. Moreover, AMTA does not provide any details as to how many customers made these observations, how frequently the observations were made, what percentage of the estimated number of 20,000 existing 220 MHz customers[51] made these observations, whether the customers making these observations might be operating in an area of unusual and

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at less than 500 watts ERP and 500 feet HAAT would simply be smaller in radius than the 28 dBu contour of a station operating *at* 500 watts ERP and 500 feet HAAT. If it is AMTA's assertion that a high quality signal is present about 50 percent of the locations, 50 percent of the time throughout a 28 dBu contour, this would be the case regardless of the station's operating parameters. Presumably, AMTA is simply using a station operating at 500 watts ERP and 500 feet HAAT as an *example* of one that provides a "high quality" signal, recognizing that it is not necessary for the station to be operating at such parameters in order to provide such a signal.

[48] AMTA Third Order Petition at 8.

[49] *220 MHz Third Report and Order*, 12 FCC Rcd at 11027-28 (paras. 176-177).

[50] AMTA's use of the term "reliable service" is not new to this proceeding. In their comments to the *Third Notice* as well as their petitions for reconsideration, commenters suggested that we provide protection to contours other than the 38 dBu contour because, they claim, "reliable" service is being received at such contours. Neither AMTA nor these commenters, however, have defined the term "reliable service," nor stated what criteria they use to determine a "reliable" 220 MHz signal.

[51] *See* AMTA Third Order Petition at 7.

favorable terrain that might cause received signal strengths to differ markedly from predicted signal strengths, or what method was used to gather the data cited by AMTA. Finally, AMTA claims that 220 MHz signals "simply talk considerably farther than those in the 800 MHz and 900 MHz bands . . . ." However, AMTA does not explain or elaborate upon this statement; and it is therefore difficult, if not impossible, for us to address the merits of its assertion.

33. INTEK contends that in the *Third Notice* proceeding, the 38 dBu protection standard was "universally opposed by the land mobile industry." It supports AMTA's position, indicating that, based on "real-world operational data for Phase I 220 MHz systems that is now available," the Commission should adopt the 28 dBu service contour.[52] INTEK also claims that the use of the 38 dBu service contour will "result in harmful interference between Phase I and Phase II licensees, a loss of existing service area for Phase I systems, and resulting 'dead spots' between Phase I and Phase II operations."[53] It therefore concludes that, if left unchanged, the Commission's protection standards "will lead to harmful interference between Phase I and Phase II licensees, diminishing the potential use of the band and devaluating its worth in the marketplace."[54]

34. In support of its position, INTEK provides an engineering analysis, based on the operation of an existing 220 MHz system located in the Los Angeles, California area, in an attempt to show that "reliable service . . . is available up to the system's 24 dBuV/m contour."[55] Specifically, INTEK provides computer-generated maps indicating the expected locations of 38 dBu, 28 dBu, and 24 dBu signals transmitted from a base station situated at the top of Mount Lukens (overlooking Los Angeles).[56] INTEK claims that "the actual coverage areas wherein no less than 50% of the mobile units can access the control channel at least 50% of the time is known to us and our customers as that depicted by the 24 dBuV/m map."[57] We do not believe that this statement by INTEK represents sufficient engineering analysis to justify re-evaluation of the existing 38 dBu protected service contour. At a

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[52] INTEK Third Order Petition at 4.

[53] *Id.*

[54] *Id.* at 5.

[55] *Id.* at 4.

[56] To be precise, each of the maps employs the Longley-Rice terrain-based, signal prediction model to show the locations where particular field strengths (*i.e.*, ≥ 38 dBu, ≥ 28 dBu or ≥ 24 dBu) are predicted to exist. INTEK Third Order Petition, Technical Showing at 2 (unpaginated), App. A-C.

[57] *Id.*, Technical Showing at 1 (unpaginated)

minimum, the circumstance of accessing a control channel is not a condition that we would use to help us determine an appropriate signal contour to be protected because it does not correlate to any particular service quality. Moreover, we are uncertain as to the relationship between accessing a control channel and INTEK's concept of "reliable service." Thus, we do not believe that INTEK's pictorial representations of the Los Angeles areas where various signal levels are predicted to be received constitute a sufficient showing to justify its claim that we should modify the existing 38 dBu service contour for the 220 MHz service.

35. SMR claims that the Commission's "initial selection of the 38 dBu contour as the best indicator of actual signal strength in the 220 MHz service appears to have been only a best guess estimate with no substantiating technical analysis or actual operating data," and that we should "change this factor now after having the benefit of actual data accumulated by operating systems and adopt a 28 dBu protected contour."[58] In response to this argument, we note that although the Commission has licensed 3,800 Phase I, non-nationwide base stations,[59] we have little data in the record attempting to justify the adoption of a 28 dBu service contour for the 220 MHz service. And, as discussed herein, we do not believe this limited amount of data has successfully justified the adoption of a 28 dBu service contour.

(b) SMR Comments and Vega Report

36. As part of its reply comments, SMR submits what it describes as an "independent technical analysis" by The Richard L. Vega Group, Inc.[60] "in order to provide the Commission with even more technical data to ensure that its decision is as informed as possible."[61] The Vega Report agrees with others who claim that we should use a 28 dBu, rather than a 38 dBu, protected service contour for the 220 MHz band,[62] and contends that a mere 2 dB reduction between the 40 dBu service contour used for the 800 MHz and 900 MHz bands and the 38 dBu service contour for the 220 MHz band is insufficient because of the "distinct frequency trends and the propagation differences between the two services."[63] The Report argues that the Commission's use of a "64 dBu protected contour" for the UHF

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[58] SMR Third Order Petition at 7.

[59] These licenses were authorized in 1993.

[60] We cite this submission as the "Vega Report" or the "Report."

[61] SMR Third Order Reply at 4. The data provided in the Vega Report is the only measured data provided by any commenter in this reconsideration proceeding.

[62] Vega Report at 1-7.

[63] *Id.* at 4.

television band (Channels 14-69), and a "56 dBu protected signal" for the high VHF television band (Channels 7-13) "establishes a benchmark *8 dB reduction* to the contour protection for stations operating in frequencies up to 600 MHz lower than in the UHF band to account for the superior propagation characteristics in the lower bands."[64]

37. We do not agree with this argument for the following reasons. First, when the Commission determined the Grade B contour for UHF and VHF stations — the 64 dBu and 56 dBu figures referenced by the Vega Report — in the 1951 rulemaking in Docket Nos. 8736, 8975, 8976, and 9175 (Television Broadcast Service), these calculations were based on a variety of factors.[65] Specifically, the Grade A and Grade B contours for television are the locations at which an acceptable television picture quality would be expected to be received at a given percentage of locations and time. When the contours were developed in 1951, the Grade A contour was meant to define the location in an urban environment where a picture of acceptable quality would be expected to be received at 70 percent of locations and 90 percent of the time, and the Grade B contour was meant to define the location in a rural environment where a picture of acceptable quality would be expected to be received at 50 percent of locations and 90 percent of the time.

38. In determining the Grade A and Grade B contour, several factors had to be taken into consideration. For example, it was determined that a signal-to-noise ratio of 30 dB was needed to produce a picture of acceptable quality, and this applied to televisions operating in all three frequency bands — Channels 14-83[66] (UHF), Channels 7-13 (high VHF), and Channels 2-6 (low VHF). In addition, there were other factors that contributed to the level of the signal received, such as the antenna dipole factor, the gain of the television receive antenna, and the transmission line loss between the antenna (presumed to be 30 feet above ground) and the television. It was also necessary to take into consideration factors contributing to noise experienced at the receiver, including receiver noise — *i.e.*, thermal noise plus the receiver noise figure — and man-made noise. In addition, it was necessary to take into account the fact that the Grade A and Grade B contours were meant to indicate the existence of the signal level 90 percent of the time and either 50 percent of the locations (for Grade B) or 70 percent of the locations (for Grade A), with adjustments having to be made for these factors.

39. Thus, certain factors contributing to the determination of the Grade A and Grade B contours were based on known electromagnetic principles (*e.g.*, the antenna dipole factor),

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[64] *Id.* (emphasis in original)

[65] 16 Fed. Reg. 3072 (Apr. 7, 1951).

[66] In 1951, the UHF television band extended to Channel 83.

others were based on the quality of television receivers at the time (*e.g.*, the determination of the signal level needed to produce a picture of acceptable quality, the noise figure of the television receiver), others were based on mathematical models (*e.g.*, "time fading" and "location variability"), and still others were based on assumptions about the configuration of the television receiver and antenna (*e.g.*, antenna gain and line loss) and the electromagnetic environment surrounding the television receiver and antenna (*e.g.*, the man-made noise factor). By deciding on what it considered to be the appropriate values for each of these factors, the Commission was able to determine the strength of a television signal that would produce picture of acceptable quality, for all three frequency bands.

40. The Vega Report points to the 8 dB difference in field strength of the Grade B contour for Channels 7-13 and Channels 14-69, and suggests that this is evidence that because Channel 14-69 and Channel 7-13 frequencies parallel the 800 MHz and 900 MHz and 220 MHz frequencies, the protected service contour for 220 MHz should similarly be much more than 2 dB below the protected service contour for the 800 MHz and 900 MHz band.[67] As indicated above, however, the determination of the television contours for Channels 14-69 and Channels 7-13 is a function of a variety of factors, some of which were unique to the television systems of the early 1950s. Thus, we would not consider the existence of different Grade B television field strength contours for different television bands to be the sole grounds for the adoption of similar field strength differences for land mobile system service contours.

41. Further, even if we were to assume *arguendo* that the fairly substantial difference between the Grade B contour for Channels 14-69 versus Channels 7-13 is evidence that we should employ a similar field strength difference for 220 MHz versus 800 MHz and 900 MHz, it is not entirely clear why we would choose to employ the Grade B, rather than the Grade A contour, for this purpose.[68] And significantly, the difference between the Grade A contour for television Channels 14-69 versus Channels 7-13 is only 3 dB, which is very close to the 2 dB difference between the 40 dBu service contour for the 800 and 900 MHz bands, and the 38 dBu service contour of the 220 MHz band.

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[67] Specifically, the Vega Report asserts that we "should apply an additional 10 dB reduction to the 220 MHz protected service contour to account for the 600 MHz difference between the 220 MHz band and the 800/900 MHz bands and the associated differences in propagation." Vega Report at 4.

[68] We note that the distance of the 38 dBu contour of a maximum parameter 220 MHz station (*i.e.*, 28 miles) is much closer to the distance of the Grade A contour of a maximum parameter Channel 7-13 television station (*i.e.*, 52 miles) than it is to the distance of the Grade B contour of a maximum parameter Channel 7-13 television station (*i.e.*, 75 miles)

42. Thus, given the fact that:

(1) the simple, mathematical difference in frequency between the different TV bands was not the only factor used to determine the Grade A and Grade B contours for the different TV bands;

(2) the factors that went into determining these contours were, for the most part, unique to television receivers and the television receiver system and environment; and

(3) even if we were to consider the television contours as a basis for determining appropriate service contours for land mobile systems, it is not clear that the Grade B contours should be used for this purpose,

we conclude that it would not be appropriate to adopt a 28 dBu protected service contour for the 220 MHz service solely because the Grade B contour for Channels 7-13 is 8 dB below the Grade B contour for Channels 14-69.

43. The Vega Report also argues that the Commission's development of a protected service contour in the cellular service "provides additional support for a modification to the 220 MHz protected contour."[69] The Report observes that "the 'outer bounds' of [cellular] service was being provided at the 32 dBu contour, which was significantly lower than the 40 dBu protected contour employed in the 800/900 MHz services, even though systems in the 800/900 MHz service operate in virtually the same frequency band as cellular."[70] The Vega Report claims that "a more appropriate and consistent accounting for the differences between the [800/900 MHz and 220 MHz] frequency bands support [*sic*] a reduction from the 32 dBu protected cellular contour of at least 4 dB, resulting in a 28 dBu protected contour for the 220 MHz service with a corresponding minimum 10 dB C/I ratio to account for the frequency difference."[71]

44. The references in the Vega Report and by SMR[72] to recent actions in the cellular service and their argument that the determination of protected service contours is frequency-dependent are difficult to reconcile. For example, the Vega Report states that, because we are

[69] Vega Report at 5.

[70] *Id.*

[71] *Id.*

[72] SMR Third Order Reply at 4-6.

employing a 32 dBu contour for cellular, we should provide a "reduction from the 32 dBu protected cellular contour of at least 4 dB, resulting in a 28 dBu protected contour for the 220 MHz service . . . ." But the Vega Report provides no calculations that produce such a 4 dB figure. The Report also acknowledges that the 32 dBu contour used for cellular is significantly lower than the 40 dBu protected contour employed for the 800 MHz and 900 MHz land mobile services — services that are in the same part of the spectrum as cellular. SMR's argument, based upon the Vega Report, that we should expand the protected service contour for the 220 MHz band from 38 dBu to 28 dBu because the determination of this contour is frequency-dependent and its argument that the Commission employs a 32 dBu contour for cellular while employing a 40 dBu contour for the land mobile services operating essentially in the same frequency band would appear to be inconsistent.

45. In support of the contention that we should provide for what the Vega Report claims is a "more realistic protected service area," the Report provides signal strength measurements produced by "an existing 220 MHz facility."[73] The station transmitter operates at 5 watts ERP, at a height of 981 meters above mean sea level (AMSL). Data was collected in four different azimuths (0^0, 225^0, 270^0, and 315^0) and at three distances from the transmitter (16, 32, and 48 miles).[74] The following data was collected:

Miles	Measurements	Directions
16	-83 dBm, -80 dBm, -80 dBm, -85 dBm	0^0, 225^0, 270^0, 315^0
32	-90 dBm, -85 dBm, -85 dBm, -95 dBm	0^0, 225^0, 270^0, 315^0
48	-100 dBm, -93 dBm, -88 dBm	0^0, 225^0, 270^0

In referring to the data provided in the Vega Report, SMR states that "as can be seen by the tabulated results . . . the readings at the 28 dBu contour point consistently showed reliable service."[75]

46. We have the following observations with regard to this data. First, we note that the particular transmitter site chosen for the Vega Report's study is situated at Tiger Mountain, which is located about 20 miles southeast of Seattle, Washington. In Section 90.621(b)(1) and (b)(3) of the Commission's Rules, the Commission identifies 19 mountains

[73] Vega Report at 6.

[74] *See id.* at Exhibit 3. According to the Report, data at azimuths 45^0, 90^0, 135^0, and 180^0 were unavailable due to mountainous terrain. The Report also indicates that data in the 315^0 direction at the 48-mile location was unavailable because this location was over water.

[75] SMR Third Order Reply at 6.

in the Seattle area, including Tiger Mountain, and four mountains in the Los Angeles area,[76] and indicates that co-channel base stations located in the vicinity of base stations transmitting from these mountaintops are deserving of special protection. This special protection is necessary because signals from base stations at these locations will propagate farther than predicted by the Section 73.699 curves.[77] Based on our knowledge of the particular terrain surrounding Tiger Mountain, we can state with confidence that any signal measurements taken in the low-lying areas to the north and west of the mountain would be greater than predicted by the Section 73.699 curves.[78] As indicated in the table above, the only data shown in the Vega Report are measurements taken in the northerly and westerly directions from Tiger Mountain (*i.e.*, at the 0°, 315°, 270°, and 225° azimuths).

47. Another concern in evaluating this data is that the Vega Report does not indicate whether each data element represents a single measurement taken at a single location (*e.g.*, one measurement taken at one location to represent the 0° azimuth data element at 16 miles, one measurement taken at one location to represent the 225° azimuth data element at 32 miles, *etc.*) or whether each data element represents an average of several measurements taken in the same general area. If it is the former, the measurements may not provide an accurate representation of the median field strengths received at those locations.[79]

48. The presumed purpose of the data provided by the Vega Report is to demonstrate that signals transmitted from this base station site propagate farther that predicted by our

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[76] One of these mountains is Mt. Lukens, which was the location of the 220 MHz base station used by INTEK in its analysis. *See* para. 34, *supra*.

[77] Section 90.621(2) also provides special co-channel separation provisions for stations located in Northern California.

[78] Also based on our knowledge of the terrain in the area around Tiger Mountain, we can state with confidence that any signal measurements taken in the mountainous areas to the east and southeast of Tiger Mountain would be significantly less than predicted by the Section 73.699 curves.

[79] This is due to the fact that the value of a signal strength can vary significantly over very short distances, especially in areas of unusual terrain, or where there is blockage from foliage or other obstructions. The determination of the curves found in Section 73.699 of the Commission's Rules, for example, required extensive field measurements in order to account for such varying types of topography and environment. Relatedly, in Section 73.686 of the Commission's Rules, we prescribe procedures for the measurement of television signals. For example, we generally require that field strength measurements of television signals be taken over a "mobile run" of at least 100 feet, with signals continuously measured on a chart recorder over the length of the run; and under certain conditions, we may also require a "cluster" of five spot measurements, with four of the measurements taken within 200 feet of the first. *See* Section 73.686(b)(2) of the Commission's Rules, 47 C.F.R. § 73.686(b)(2).